
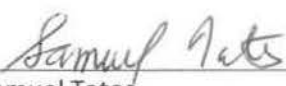


Region 6 - Enforcement & Compliance Assurance Division

INSPECTION REPORT

Inspection Date(s):	10/7-9/19	
Media Program:	Air	
Regulatory Program(s)	RMP	
Company Name:	Samsung Austin Semiconductor	
Facility Name:	Samsung Austin Semiconductor	
Facility Physical Location:	12100 Samsung Blvd	
(city, state, zip code)	Austin, Texas 78754	
Mailing address:	12100 Samsung Blvd	
(city, state, zip code)	Austin, Texas 78754	
County/Parish:	Travis County	
Facility Phone Number	512-672-1000	
Facility Contact:	Tim Jones	Environmental Manager
	t.jones@samsung.com	
FRS Number:	110000465531	
Identification/Permit Number:	TX0000004845300072	
Media Identifier Number:	100000027455	
NAICS:	334413	
SIC:		
Personnel participating in inspection:		
Tim Jones	Samsung	Environmental Manager
Glen Deering	Samsung Austin Semiconductor	PSM Engineer
Ross Thompson	Samsung Austin Semiconductor	General Counsel
David Ellingsworth	Samsung Austin Semiconductor	H&S Manager
Krista Von Arx	Samsung Austin Semiconductor	H&S Senior Director
Ana Russell	Samsung Austin Semiconductor	Environmental Engineer
Marie Stucky	EPA Region 6	Inspector
EPA Lead Inspector Signature/Date	 Marie Stucky	11/21/19 Date
Supervisor Signature/Date	 Samuel Bates	11/21/2019 Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

I, EPA Region 6 inspector, Marie Stucky, arrived at the Samsung Austin Semiconductor (SAS) at 9:00AM on October 7, 2019 for an announced inspection. I met with Tim Jones and others listed on Page 1 of this report. I presented my credentials to Tim Jones and others in the opening conference and informed them that this was an EPA inspection to determine compliance with the Risk Management Program (RMP) requirements of the Clean Air Act (CAA). The scope of the inspection is to evaluate and determine compliance with the CAA Section 112(r) and the Chemical Accident Prevention Provisions in 40 C.F.R. Part 68. SAS is a not a union facility.

FACILITY DESCRIPTION

SAS started in 1997 as a semiconductor manufacturer. They have developed 180 acres at the facility and maintain 3,600 employees and 2,500 contractors. The facility has two covered processes using silane and anhydrous hydrogen chloride. Versum, a contractor for SAS, operates the RMP covered processes at the facility. The day I arrived at the facility, Versum was purchased by Merck. In this report, I will refer to the contractor as Versum, since the documentation provided throughout the inspection referenced Versum.

Section II - OBSERVATIONS

40 C.F.R. Part 68 – CHEMICAL ACCIDENT PREVENTION PROVISIONS

Subpart A – General

40 C.F.R. § 68.10 Applicability – I observed that SAS is a stationary source that has an Air Operating Permit and more than a threshold quantity of regulated substances in a process; therefore, these regulations are applicable. SAS submitted an RMP that describes the process containing toxic and flammable chemicals held at more than a threshold quantity. One of the processes is Program 3 because the facility is subject to Occupational Safety and Health Administration's (OSHA) Process Safety Management Standard (PSM), 29 C.F.R. § 1910.119. SAS is a semiconductor manufacturing plant with a NAICS Code of 334413.

40 C.F.R. § 68.12 General requirements – I reviewed the RMP submitted by SAS on February 2, 2016, that lists two processes. SAS determined that the flammables process met the requirements of Program Level 1. SAS determined that the toxics process met the requirements of Program Level 3. Ammonium Hydroxide was not included in their RMP submission, even though the amount at the facility is over the threshold quantity (Appendix 1). **[Area of Concern (AOC) 1]** According to additional documentation provided by SAS after the inspection, a preliminary determination by a SAS contractor revealed that each individual process did not exceed the threshold quantity; however, the documentation indicated that a complete assessment would be needed to verify the preliminary determination (Appendix 2).

40 C.F.R. § 68.15 Management – SAS has developed a document showing the organization chart and PSM Element Ownership. While discussing the overall responsibility for overseeing the implementation of the RMP elements, the Health and Safety (H&S) Senior Director was identified as the person with overall responsibility; however, the Senior Director for the whole facility is listed as the person with the

overall responsibility on the organization report. Additionally, the organization chart lists different positions as persons responsible for implementing individual requirements, however, operating procedures were not included in the list of program elements with an assigned responsible person. (Appendix 3). [AOC 2]

Subpart B – Hazard Assessment

40 C.F.R. § 68.20 Applicability – SAS prepared worst-case release scenario analyses and completed the five-year accident history review. Since SAS has a Program 3 toxic process and a Program 1 flammable process, they must comply with both the flammable and toxic sections in this subpart.

40 C.F.R. § 68.22 Off site consequence analysis parameters – I observed that SAS used parameters required in this part to calculate toxic worst-case and alternative release scenarios and the flammable worst case. SAS used parameters specified by EPA in this rule by using RMP*Comp™ to determine the scenarios using appropriate wind speeds, stability classes, ambient temperature and humidity values, height values, and surface roughness values.

40 C.F.R. § 68.25 Worst-case release scenario analysis – During the inspection, I reviewed documentation from SAS regarding the worst-case release scenario analyses. These analyses for flammables and toxics used the RMP*Comp™ Model.

40 C.F.R. § 68.28 Alternative release scenario analysis – SAS identified and documented an alternative release scenario for the RMP covered toxic substance in their RMP. This analysis used the RMP*Comp™ Model.

40 C.F.R. § 68.30 Defining off site impacts – Population – SAS used the most current (2010) Census Bureau population data and the distance to endpoints to calculate the population numbers reported in their RMP. SAS used Google Maps and populations associated to related zip codes to define the population surrounding the facility.

40 C.F.R. § 68.33 Defining off site impacts – Environment – Environmental receptors were not identified in the distance to the endpoint map, nor were they identified in the RMP submission. [AOC 3]

40 C.F.R. § 68.36 Review and update – I reviewed the documentation that illustrated reviews and updates regarding the off site consequences are completed at least every five years.

40 C.F.R. § 68.39 Documentation – SAS provided documentation of the off site consequence analyses. Included in the documentation of the worst-case and alternative release scenarios was a description of the vessel or pipeline, assumptions and parameters used. The documentation also included the estimated quantity released, release rate, duration of release, methodology used, and the data used to estimate population. The documentation did not include the rationale for the selection of the alternative release scenario. [AOC 4]

40 C.F.R. § 68.42 Five-year accident history - SAS reported no accidental release in their RMP. I also reviewed the additional incident investigations on site for additional incidents that may have required addition to SAS's five-year accident history.

Subpart D – Program 3 Prevention Program

40 C.F.R. § 68.65 Process safety information (PSI) – SAS provided written process safety information. I reviewed a selection of materials across the covered process units. The PSI I reviewed included information pertaining to the hazards of the regulated substances used or produced by the processes, information pertaining to the technology of the processes, and information pertaining to the equipment in the processes. The process safety information contained Safety Data Sheets (SDSs), which included information on toxicity, permissible exposure limits, physical data, reactivity data, corrosivity data, thermal and chemical stability data, and the hazardous effects of inadvertent mixing of materials that could foreseeably occur. The facility documented information pertaining to the technology of the processes with block flow diagrams, process chemistries, maximum intended inventories, safe upper and lower limits, and evaluation of consequences of deviation. Also, the PSI included Piping and Instrument Diagrams (P&IDs), electrical classifications, relief system designs, ventilation system designs, design codes and standards, material and energy balances, and safety systems.

40 C.F.R. § 68.67 Process hazard analysis (PHA) – Versum, who operates the covered process for SAS, conducted re-validation PHAs for the toxic RMP process in April 2013, December 2014, and June 2017. While on site, I requested PHAs and their respective recommendations. The PHA included the hazards of the process, engineering and administrative controls applicable to the hazards, consequences of failure of engineering and administrative controls, stationary siting, human factors, and an evaluation of a range of the possible safety and health effects of failure of controls. The technique used to conduct the process PHA was Hazard and Operability Study (HAZOP). The PHA in June 2017 was conducted by a team that included appropriate personnel from both Versum and SAS, and the findings and recommendations were documented. In reviewing the corrective action resolutions, Versum/SAS has not promptly addressed the team's findings and recommendations. For the 2017 resolutions, due dates have passed and the recommendations are still open. Three recommendations from the December 2014 also are still open, and no due date was set for addressing these issues (Appendix 4). **[AOC 5]**

40 C.F.R. § 68.69 Operating procedures – Versum developed and implemented written operating procedures that provide instructions or steps for conducting activities associated with the covered process at SAS, consistent with the documented safety information. I reviewed selected operating procedures to identify steps for each operating phase (initial startup, normal operations, emergency shutdown, normal shutdown, and startup following a turnaround or after emergency shutdown). The emergency shutdown procedure does not include conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner (Appendix 5). **[AOC 6]** Additionally, SAS did not provide annual certifications that the operating procedures are current and accurate. **[AOC 7]**

40 C.F.R. § 68.71 Training – The training records for Versum contract employees who operate the covered processes include both paper and electronic records. *Intellex* is used for online training. Additionally, qualification cards are used to document knowledge and understanding of the process, and are signed off by a supervisor. The qualification card takes a couple of years to complete. I reviewed eight employee training records. In some instances, the initial training documentation did not show the dates that the initial training took place or the date that the trainer observed the work. **[AOC 8]** Additionally, refresher trainings was not provided for employees who have worked in the process over three years to assure that the employee understands and adheres to the current operating procedures of the process (Appendix 6). **[AOC 9]**

40 C.F.R. § 68.73 Mechanical integrity – I requested mechanical integrity records from RMP covered equipment. A written procedure for maintaining the integrity of the equipment in the covered process was not provided. I spoke with representatives who are responsible for mechanical integrity, and reviewed documentation of preventative maintenance on tanks, piping, and instrumentation. [AOC 10]

40 C.F.R. § 68.75 Management of Change (MOC) – I asked for, and was shown, MOCs completed by Versum at the facility and the written procedure for MOC. I reviewed MOCs for changes which occurred in covered processes. The changes made to the operating procedures occurred prior to the MOC being completed. In one instance, revisions to the operating procedures were dated August 30, 2017 (Appendix 7) but the MOC was not initiated until September 15, 2017 (Appendix 8). [AOC 11]

40 C.F.R. § 68.77 Pre-startup safety review (PSSR) – No pre-startup safety reviews were provided by the facility for changes to the process that would require a pre-startup safety review.

40 C.F.R. § 68.79 Compliance audits – SAS conducted their most recent RMP compliance audit on October 17-19, 2016. The compliance audit included a list of people knowledgeable about the process, a report of the findings, and the recommended action items in response to the findings. The compliance audit did not include a certification statement (Appendix 9). [AOC 12] Additionally, many of the due dates have passed for completing the recommendations and they have not been completed. (Appendix 10). [AOC 13]

40 C.F.R. § 68.81 Incident investigation – Prior to the inspection, I requested the incident investigations for all incidents which resulted in, or could reasonably have resulted in, a catastrophic release of a regulated substance over the past three years. I reviewed the provided incident investigations. In one report for an incident on August 25, 2017, the documentation did not include how the report was reviewed with all affected personnel. (Appendix 11). [AOC 14]

40 C.F.R. § 68.83 Employee participation – I reviewed an employee participation plan during this inspection, which was written by Air Products, the SAS contractor prior to Versum. The plan included a description of how the employees and their representatives would have access to the process hazard analyses and all other information required under this rule, but it has not been updated to reflect that Versum is the current contractor. Additionally, it was not clear that the plan was still in effect and followed (Appendix 12). Additional information related to employee participation was included in a portion of the Process Safety and RMP document, but this information did not specify how employees and their representatives would have access to information required to be developed under this rule. (Appendix 13). [AOC 15]

40 C.F.R. § 68.85 Hot work permit – While on site, I reviewed hot work permits. The hot work permits included the dates authorized for hot work and identified the objects on which hot work was performed.

40 C.F.R. § 68.87 Contractors – I observed that contractors are vetted internally by reviewing prequalification forms, which include information covering background screenings, insurance coverage, training requirements, and qualification letters. Each year, contractors must update their status with re-qualification forms. The contractors are onboarded using the *OSHA 10-Hour* and *OSHA 30-Hour* training courses for supervisors, and three-hour site-specific training. SAS maintains a badge access system and conducts weekly meetings with safety representatives from the contractors. Field teams periodically review contractor work.

Subpart E – Emergency Response

40 C.F.R. § 68.90 Applicability – SAS employees include designated first responders that respond to fires and releases on site. I requested, and was provided, the SAS Emergency Response Plan. I reviewed this document on site and observed that the emergency response plan did not include information on proper first-aid and emergency medical treatment necessary to treat accidental human exposures. This information could be found in other documentation from SAS, but was not included in the plan (Appendix 14). [AOC 16] Additionally, I reviewed training records for designated emergency responders, and some SAS employees did not attend all required safety meetings, as defined in SAS training procedures (Appendix 15). [AOC 17]

40 C.F.R. § 68.195 Required corrections – The RMP for this facility was re-submitted five times between 1999 and 2019. The most recent re-submission prior to the inspection was submitted on February 2, 2016. At the time of the inspection, the emergency contact 24-hour phone number was not answered when called from the conference room at the facility. SAS submitted a re-submission on October 30, 2019, that included an updated emergency contact 24-hour phone number. [AOC 18]

Section III – AREAS OF CONCERN (AOCs)

1. 40 C.F.R. § 68.12(a) – General Requirements

(a) General requirements. The owner or operator of a stationary source subject to this part shall submit a single RMP, as provided in §§ 68.150 to 68.185. The RMP shall include a registration that reflects all covered processes.

Ammonium Hydroxide was not included in the RMP submission, even though the amount at the facility is over the threshold quantity (Appendix 1).

2. 40 C.F.R. § 68.15(b) & (c) - Management

(b) The owner or operator shall assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements.

(c) When responsibility for implementing individual requirements of this part is assigned to persons other than the person identified under paragraph (b) of this section, the names or positions of these people shall be documented, and the lines of authority defined through an organization chart or similar document.

The H&S Senior Director was identified verbally during the inspection as the person with overall responsibility; however, the facility's Senior Director is listed as the person with the overall responsibility on the RMP organization chart. Additionally, the organization chart lists different positions as persons responsible for implementing individual requirements; however, operating procedures were not included in the list of program elements and requirements (Appendix 3).

3. 40 C.F.R. § 68.33 Defining Off Site impacts – Environment

(a) The owner or operator shall list in the RMP environmental receptors within a circle with its center at the point of the release and a radius determined by the distance to the endpoint defined in § 68.22(a) of this part.

Environmental receptors were not identified in the map with the distance to the endpoint, nor were they identified in the RMP submission..

4. 40 C.F.R. § 68.39(b) Documentation

(b) For alternative release scenarios, a description of the scenarios identified, assumptions and parameters used, and the rationale for the selection of specific scenarios; assumptions shall include use of any administrative controls and any mitigation that were assumed to limit the quantity that could be released. Documentation shall include the effect of the controls and mitigation on the release quantity and rate.

The documentation did not include the rationale for the selection of the alternative release scenario.

5. 40 C.F.R. § 68.67(e) Process Hazard Analysis

(e) The owner or operator shall establish a system to promptly address the team's findings and recommendations; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

For corrective action resolutions, Versum and/or SAS have not promptly addressed the team's findings and recommendations. For the 2017 resolutions, due dates have passed, and the recommendations are still open. Three recommendations from the December 2014 PHA are still open, and no due date has been set for addressing these issues (Appendix 4).

6. 40 C.F.R. § 68.69(a)(1)(iv) Operating Procedures

(iv) Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.

The emergency shutdown procedure does not include conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner (Appendix 5).

7. 40 C.F.R. § 68.69(c) Operating Procedures

(c) The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to stationary sources. The owner or operator shall certify annually that these operating procedures are current and accurate.

Annual certifications that the operating procedures are current and accurate were not provided.

8. 40 C.F.R. § 68.71(c) Training

Training documentation. The owner or operator shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The owner or operator shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

In some instances, the initial training documentation did not show the dates that the initial training took place or the date that the trainer observed the work (Appendix 6).

9. 40 C.F.R. § 68.71(b) Training

(b) Refresher training. Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The owner or operator, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.

Refresher trainings was not provided for employees who have worked in the process over three years to assure that the employee understands and adheres to the current operating procedures of the process (Appendix 6).

10. 40 C.F.R. § 68.73(b) Mechanical Integrity

(b) Written procedures. The owner or operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.

A written procedure for maintaining the integrity of the covered processes was not provided.

11. 40 C.F.R. § 68.75(b) Management of Change

(b) The procedures shall assure that the following considerations are addressed prior to any change:
(1) The technical basis for the proposed change;
(2) Impact of change on safety and health;
(3) Modifications to operating procedures;
(4) Necessary time period for the change; and,
(5) Authorization requirements for the proposed change.

The changes made to the operating procedures occurred prior to the MOC being completed. In one instance, revisions to the operating procedures was dated August 30, 2017 (Appendix 7) but the MOC was not initiated until September 15, 2017 (Appendix 8).

12. 40 C.F.R. § 68.79(a) Compliance Audits

(a) The owner or operator shall certify that they have evaluated compliance with the provisions of this subpart for each covered process, at least every three years to verify that the procedures and practices developed under the rule are adequate and are being followed. When required as set forth in paragraph (f) of this section, the compliance audit shall be a third-party audit.

The October 2016 compliance audit did not include a certification statement (Appendix 9).

13. 40 C.F.R. § 68.79(d) Compliance Audits

(d) The owner or operator shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected.

Many of the due dates have passed for completing actions/resolutions associated with the recommendations and they have not been completed (Appendix 10).

14. 40 C.F.R. § 68.81 Incident Investigations

(f) The report shall be reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees where applicable.

SAS was unable to provide documentation of how the findings of the August 25, 2017, incident investigation and report was reviewed with all affected personnel (Appendix 11).

15. 40 C.F.R. § 68.83 Employee Participation Plan

(a) The owner or operator shall develop a written plan of action regarding the implementation of the employee participation required by this section.

The plan included a description of how the employees and their representatives would have access to the process hazard analyses and all other information required under this rule, but the plan has not been updated to reflect the current contractor (Versum), nor was it clear that the plan was still being implemented as written (Appendix 12). Additional information related to employee participation was included in a separate portion of the Process Safety and RMP document, but did not specify how employees and their representatives would have access to information required to be developed under this rule (Appendix 13).

16. 40 C.F.R. § 68.95(a)(1)(ii) Emergency Response Plan

(ii) Documentation of proper first-aid and emergency medical treatment necessary to treat accidental human exposures

The written plan I reviewed on site did not include information on proper first-aid and emergency medical treatment necessary to treat accidental human exposures. This information could be found in other separate documentation from SAS, but was not referenced or included in the emergency response plan (Appendix 14).

17. 40 C.F.R. § 68.95(a)(3) Emergency Response Plan

(3) Training for all employees in relevant procedure

The training records I reviewed for SAS emergency responders indicated that some SAS employees had not attended all required safety meetings, as defined by the SAS training procedures (Appendix 15).

18. 40 C.F.R. § 68.195 Required Corrections

(b) Emergency contact information - Beginning June 21, 2004, within one month of any change in the emergency contact information required under § 68.160(b)(6), the owner or operator shall submit a correction of that information.

At the time of the inspection, the emergency contact 24-hour phone number was not answered when called from the conference room at the facility.

Section IV – FOLLOW UP

I conducted a closing conference at SAS on October 9, 2019. During the closing conference, I reviewed the Areas of Concern noted during the inspection. Additional documents requested during the inspection were received by EPA on November 4, 2019, after exiting the Facility on October 9, 2019.

Section V – LIST OF APPENDICES

CBI Appendices (not included in published version of the report)

- Appendix 1 - Ammonium Hydroxide Calculation
- Appendix 2 - Ammonium Hydroxide System Review and RMP Applicability Determination
- Appendix 3 - Organization Chart & PSM Element
- Appendix 4 - PHA Action Resolutions
- Appendix 5 - Emergency Stop Procedure
- Appendix 6 - Employee Training Records
- Appendix 7 - 19.4210
- Appendix 8 - MOC 2765
- Appendix 9 - Compliance Audit
- Appendix 10 - Action Tracker
- Appendix 11 - Incident Investigation
- Appendix 12 - Employee Participation Plan
- Appendix 13 - Process Safety and Risk Management Program
- Appendix 14 - Emergency Response Plan
- Appendix 15 - ER Team List